# of Care
with Nasal Continuous Positive Airway
Pressure Use Among Patients with Obstructive Sleep Apnea Syndrome

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Introduction

- **One third of our lives is spent sleeping**
- **Restful sleep is essential to a healthy life**
- **Obstructive Sleep Apnea Syndrome (OSAS) is a serious sleep disorder due to Excessive Daytime Sleepiness (EDS)**

Definitions

Obstructive Sleep Apnea (OSA)

- **Cessation or partial obstruction of airflow**
- **Multiple brief arousals fragment sleep**

Excessive Daytime Sleepiness (EDS)

- **Most prominent presenting complaint**
- **EDS and OSA constitute the diagnosis of OSAS**

Risk Factors for OSAS

- Gender men > women
- Age (40 – 65 years)
- Obesity (most significant risk factor)
- Familial history
- Neck girth

Epidemiology

INCIDENCE

- **Unknown**
- **Insidious nature difficult to ID disease free cohorts**
- **Night to night variability of apneas**
- **Measurement error**

PREVALENCE

- **Estimates range 4 - 5 % general population**
- **4% Men**
- **2% Women**
- **20 - 62% of age 40 – 65 y/o**

Public Health Impact

- **Motor vehicle accidents (10%)**
  Drowsy Driving (62% adults) men > women
  Falling asleep at wheel (33%)
  Sleepiness factor in 57% truck drivers
  deaths

- **10 million people are estimated to have undiagnosed OSAS**

Nasal Continuous Positive Airway Pressure (CPAP) Therapy

- Mainstay of therapy for OSAS
- Pressurization of upper airway by nasal mask
- Reduces or reverses apneas
- Reduces mortality rate (Keenan et al., 1994)
- Side effects

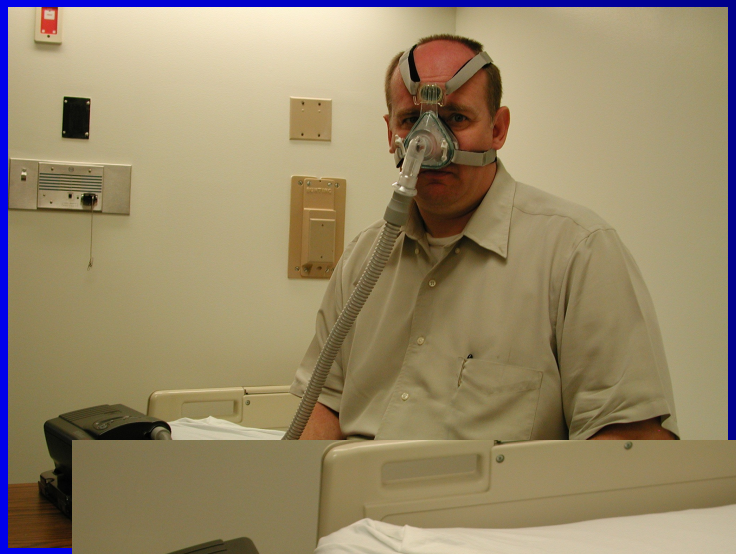
  Mask intolerability

  Nasal congestion

  Dry mouth

  Without nightly use, relapse to pretreatment state (EDS) (Kribbs, et al., 1993)

Picture of CPAP Mask and Device



Traditional Management of Nasal CPAP Therapy

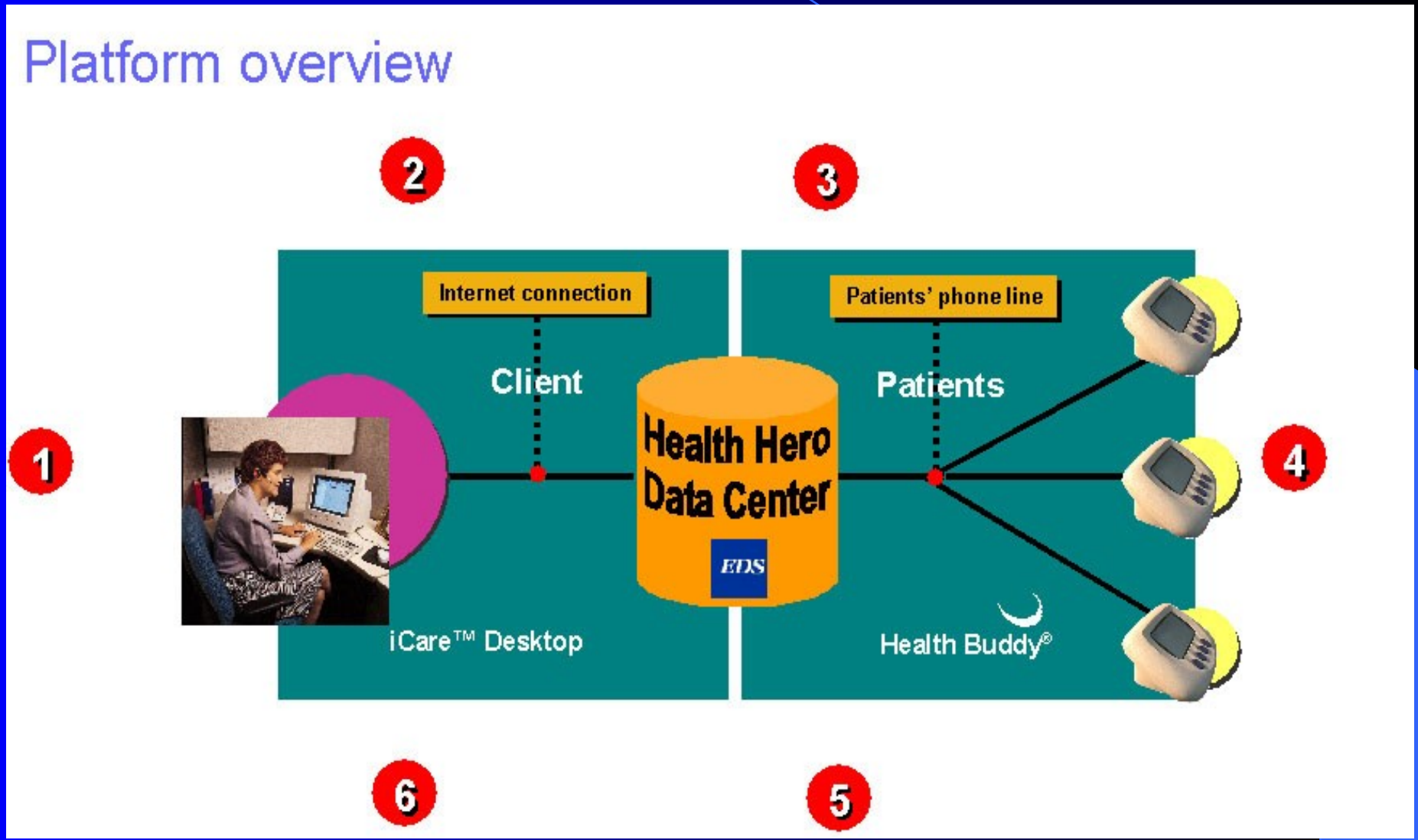
- **CPAP use > 4 hours on 70% of days (Hudgel et al., 1996)**
- **No universal definition or guidelines for CPAP compliance or regular use**

Telemedicine Management Models

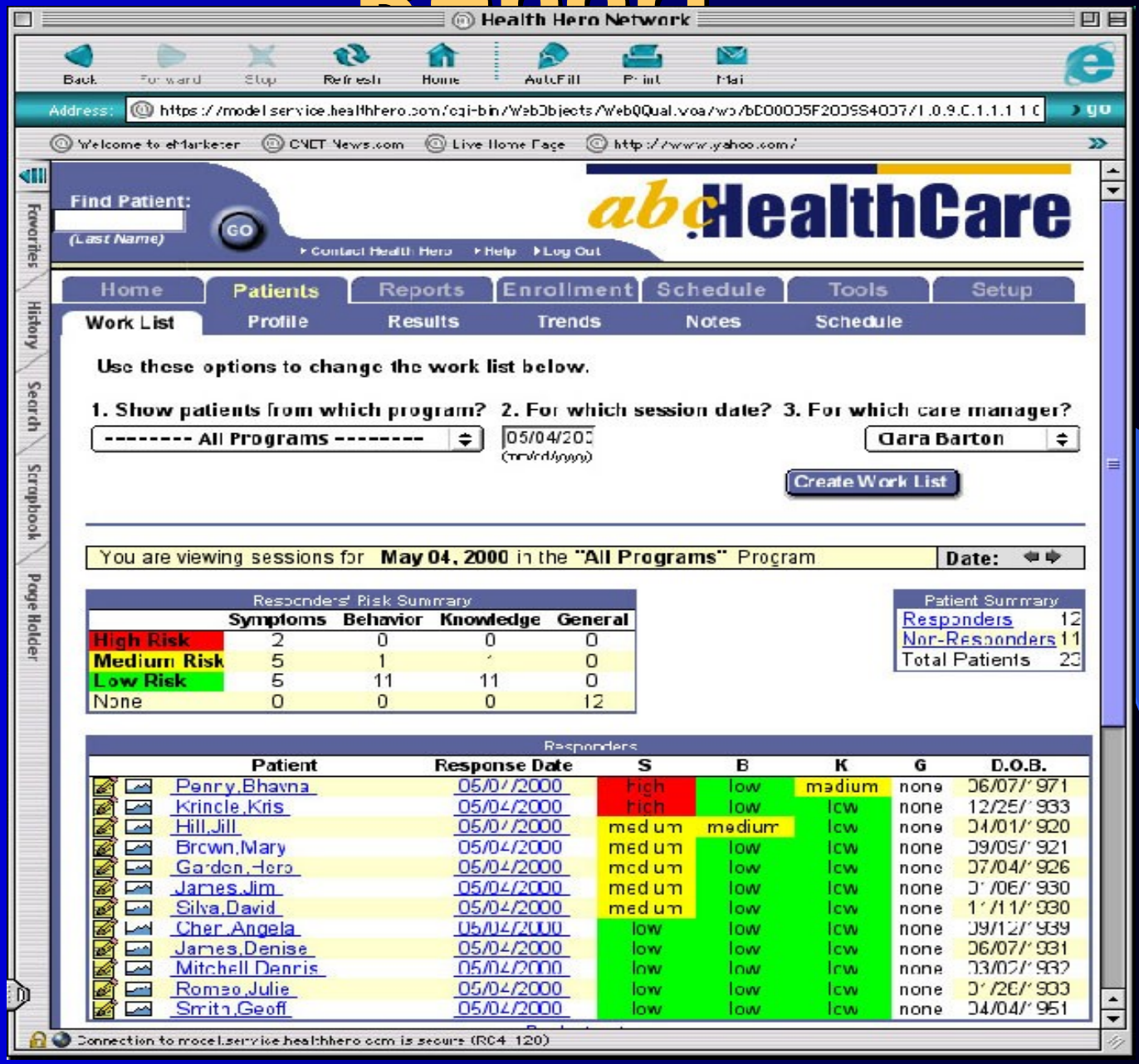
- Use of telecommunications technology to remotely treat and monitor patients
- CHF--70% improved blood pressure, 90% reduced weight (Lusignan, et al., 2000)
- Asthma--positive attitude toward the use of a palm pilot in symptom mgmt (Finkelstein, et al., 1998)

Health Hero Network's (HHN) Health Buddy

HHN Platform Overview



Patient Summary Report



Research Question

- **How two groups of patients with OSAS randomized to either a telemedicine or a traditional management model of care compared in nasal CPAP use, functional status, self-efficacy and client satisfaction?**

Research Design

- **Randomized Control Trial**

- **Treatment Groups**
  - **Intervention (Telemedicine)**
  - **Control (Traditional Care)**

Outcome Variables
with observation intervals

- **CPAP Use (average hours and proportion)**
  30 days
- **Functional Outcomes of Sleep**
  Enrollment and 30 days
- **Client Satisfaction**
  30 days
- **Generalized Perceived Self-Efficacy**
  Enrollment and 30 days

Sample Characteristics

- **Gender**
  84 males (69%)

  38 females (31%)
- **Age**
  45 years (21-64)
- **Marital Status**
  Married (84%)
- **Employed- 88%**
- **Educational level**
  > Bachelor's degree (50%)
- **Ethnicity**
  Caucasian (54%)
  African-Americans (42%)
- **Military Status**
  Active duty (50%)
  Retired participants (48%)
- **Annual income**
  (60%) >$50,000

Sample Size

Traditional Care (N=67)

- 58- Completed Study
- 8- LTF
- 1- Withdrew

Telemedicine Care (N=66)

- 56-Completed Study
- 1- LTF
- 9- Withdrew

Data Analyses

- **A chi square analysis was used to assess the differences between both groups**
- **Two sample independent *t*-test was used to compare treatment group means**

Results

	Telemedicine	Traditional	P Value
Age	44 ± 8.5	46 ± 10	
CPAP pressure	9.0 ± 2.79	8.8 ± 2.2	p = .82
Epworth	14 ± 4.0	14 ± 4.3	p = .89

Results
Chi Square Analysis

	χ^2	P
Gender status	.79	.67
Body frame	1.72	.78
Ethnicity	7.35	.49
Marital status	9.65	.29
Educational level	9.43	.30
Employment status	.60	.43
Individual income	2.13	.71
Military status	2.76	.59
OSAS severity	3.36	.49

Summary of T-test Analysis Examining CPAP Mean Scores Between the Traditional and Telemedicine Care Groups

Group

Group		Mean	SD	*t*	df	p	Confidence Intervals
Group							
Traditional Care	(58)	4.22	2.05	-.163	112	.87	-.84565, .71731
Telemedicine Care	(56)	4.29	2.15				

Summary of T-test Analysis Examining the Mean Proportion of CPAP Use Between the Traditional and Telemedicine Care Groups

Group		Mean	SD	*t*	df	p	Confidence Intervals
Traditional Care	(58)	50.1	33.8	.501	111	.61	-9.4470, 15.8458
Telemedicine Care	(56)	46.9	34.2				

Summary of T-test Analysis Examining the Difference in Functional Status Mean Scores Between the Traditional and Telemedicine Care Groups

Group		Mean	SD	*t*	df	p	Confidence Intervals
Traditional Care	(62)	2.27	4.56	.306	117	.76	-1.30722, 1.78543
Telemedicine Care	(57)	2.03	3.88				

Summary of T-test Analysis Examining Client Satisfaction Mean Scores Between the Traditional and Telemedicine Care Groups

Group		Mean	SD	*t*	df	p	Confidence Intervals
Traditional Care	(61)	28.0	3.51	-.776	113	.43	-1.68966, .73823
Telemedicine Care	(54)	28.5	3.05				

Results
Client Satisfaction

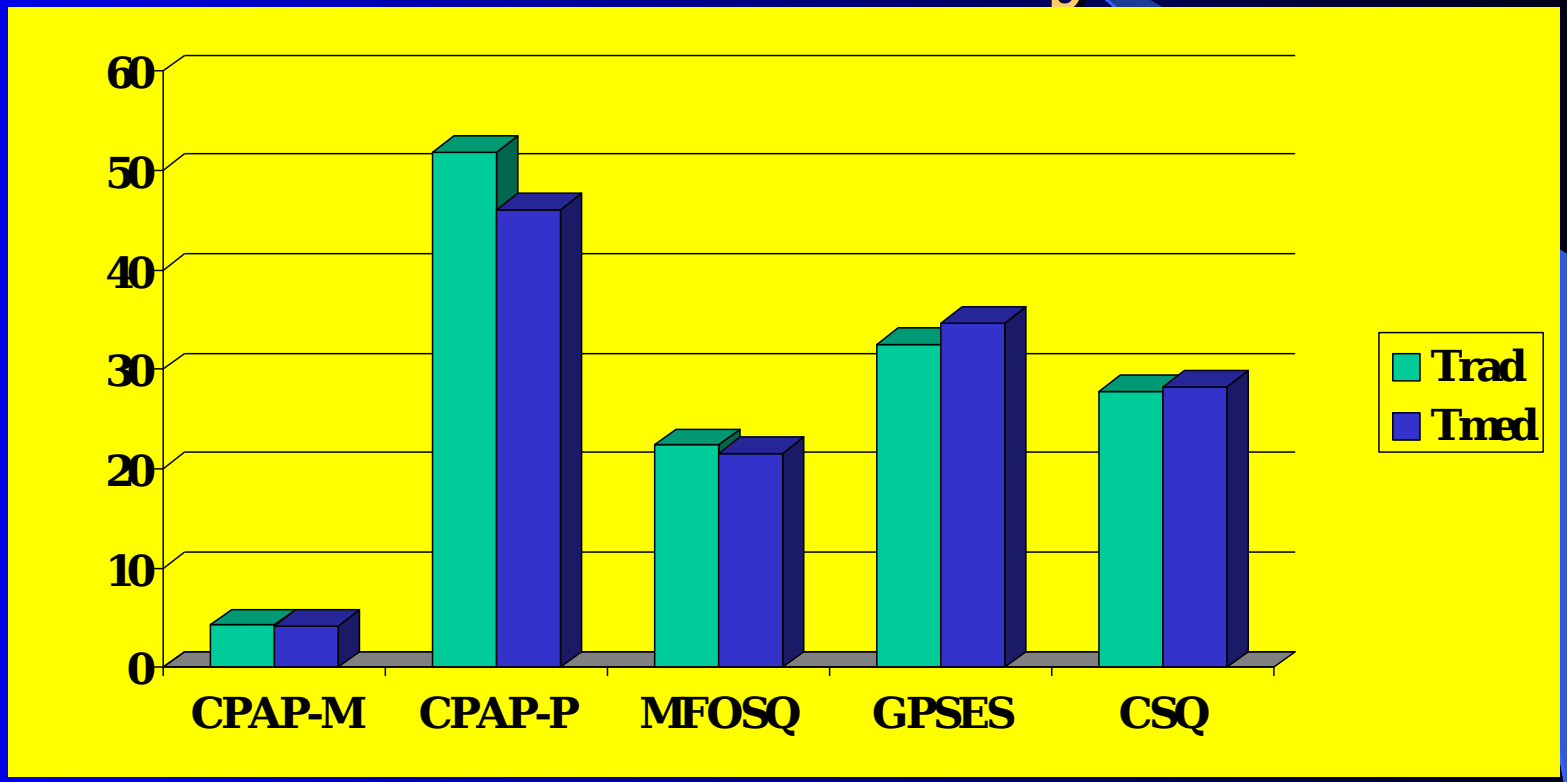
Health Buddy

- Satisfied Use-70%
- Satisfied Communication-70%
- Easy-82%
- No difficulty with use-83%
- Willing to continue-75%

Summary of T-test Analysis Examining the Difference in General Perceived Self-Efficacy Mean Scores Between the Telemedicine and Traditional Care Groups

Group	Mean	SD	*t*	df	p	Confidence Intervals
Traditional Care	(62) 2.0	5.68	1.106	117	.27	-.87448, 3.08501
Telemedicine Care	(57) .89	5.21				

Analysis of the inter-group comparisons across the measures under study



Summary

- **Patients in the Telemedicine care group used CPAP no differently when compared to participants in the Traditional care group (usual care)**

- **Patients in the Telemedicine care group had no significant improvement in functional status compared to participants in the Traditional Care Group (usual care)**

Summary

- **Patients in the Telemedicine Care Group were no more satisfied in clinic services compared to the Traditional Care Group**

- **More than three quarters of the participants in the Telemedicine group were satisfied with the Health Buddy computer**

Summary

- **General perceived self-efficacy (GSES)**

  (general confidence to overcome obstacles and barriers) was no different in the Telemedicine care group compared to the Traditional Care Group.

Implications for Practice

- **Telemedicine is equally useful and beneficial in the therapeutic management of patients with OSAS who use CPAP therapy.**

- **Telemedicine is considered and recommended as a viable and suitable option of care in the clinical management of patients with OSAS who use CPAP therapy.**

Recommendations For Future Research

- Long-term study to evaluate the effectiveness of telemedicine
- Cost-effectiveness of telemedicine to compare money, resources and time to traditional care
- Telemedicine
  - Interactive
  - "Real time"
  - Tailored to the patient's needs
  - Web based